Methods of Applied Math II - 46412 - MATH 366 - 001 **Spring 2019** **Wubben Hall 112**

Instructor: Dr. Phil Gustafson
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Office Hours: 1-1:50 pm MWF; 11 – 11:50 am TR. Appointments are also available (24 hours advanced notice recommended).

Text: *Advanced Engineering Mathematics,* 10th Edition, by Erwin Kreyszig; Wiley Publishers, 2011.

Course Description: This course introduces and develops common numerical methods for solving problems essential to computational math, engineering and science. Numerical methods are techniques by which problems are formulated so that they can be solved using computational procedures. We will use software such as MATLAB, Python, Excel, Maple and Desmos to implement numerical methods. A detailed listing of topics is given in the course calendar below.

Student Learning Objectives: The student learning outcomes for this course are to develop the following:
- Independent learning skills, in particular, reading skills
- Problem-solving skills
- Mathematical language skills
- Persistence, skill in exploration, conjecture, generalization
- Appreciate necessity for rigor and precision in mathematics
- Develop skills to implement and use technology, and to understand its limitations
- Acquire mathematics background relevant to other subjects

Prerequisite: A grade of C or better in Math 360 Methods of Applied Mathematics.

Required: Access to a computer with a word processor (typically Word), internet, MATLAB, Python and Excel.

Grading:

Attendance & Participation	20%
Class Preps	30%
Homework	30%
Final Project	20%

Grading Scale:

90 - 100 %	A
80 - 89%	B
70 - 79%	C
60 - 69%	D
0 - 59%	F

Credit Hours Policy: An undergraduate student should expect to spend on this course a minimum of two hours outside of the classroom for every hour in the classroom. The outside hours may vary depending on the number of credit hours or type of course. More details are available from the faculty member or the department office and in CMU's *Curriculum Policies and Procedures Manual*.

Attendance & Participation: Attendance will be taken daily and converted into a percentage at the end of the semester. Class time will be used to develop and reinforce the following course-related content and activities:
- Concepts from the reading
- Computational skills and methods
- Collaborations with classmates and instructor

Your attendance for this class will therefore be important. See *Attendance, Course Participation, and Academic Behavior* statements later in this document for further information on the role of attendance and class conduct.

Class Preps: To help develop your independent reading skills, mathematical language skills, and professional planning skills, you will be reading ahead & writing up section material to turn in before class. Additional information on class preps is given later in this document.

Homework: Homework will be assigned from the exercises in the book and/or from extensions of in-class activities. Some assignments may replace in-class coverage of material from the book.

Final Project: This will be a larger project building on techniques developed during the semester, and will include a typewritten component and a presentation component.

Cell Phone Policy: Your primary responsibility during class is to participate in the learning process, including listening and writing. Cell phone usage interferes with this. At the beginning of class cell phones (and all other portable technology devices) must be silenced and put away. In-class image and video capture is not allowed except in unusual circumstances and permission must be obtained in advance. Persistent cell phone usage during class may result in a 2% deduction from your semester grade (see Course Participation below), with additional consequences possible (see Academic Behavior below). Furthermore, during quizzes and exams, cell phone violations will be interpreted as acts of academic dishonesty.

Attendance: A portion of your grade will be based on attendance. Daily attendance in class is crucial for your learning in this course. If you miss class, it is your responsibility to make up what was covered. I may follow the statement on attendance in the Maverick Guide, as part of the CMU Student Code of Conduct found online, which enables the instructor to initiate a drop or withdrawal for any student who fails to attend regularly. Read this attendance statement in your catalog carefully.

Course Participation: Course participation includes coming to class a few minutes early, being prepared for class, asking questions, participating in discussions and activities, and seeking help outside of class when appropriate. If you frequently do not come to class on time, are not prepared, and your participation detracts from the class (including unapproved cell phone and laptop use), then this may result in a 2% deduction from your semester grade. Similarly, when you seek help during office hours, bring specific questions along with the work that you have attempted.

Academic Behavior: The overall goals of this class and of the college are for you to learn, to learn how to learn, and to pick up skills needed to be successful in life. Learning in the classroom requires an environment in which each student feels comfortable listening, thinking, concentrating, focusing, and asking questions. When you choose to attend class, you are agreeing to behave in such a way as to not disrupt the learning process of others. Otherwise, you jeopardize your enrollment in the class. So come to class prepared, interested in learning, and respectful of others. See the above paragraph on Course Participation for more guidelines on appropriate behavior in the classroom, and also in the CMU Student Code of Conduct found online.

Academic Dishonesty: Cheating is serious offense and will be treated as such. Cheating is an act of academic dishonesty, which includes using another person's work as though it was your own or knowingly permitting another student to use your work. The consequences of cheating on an assignment or quiz may result in the grade of 0 for all those involved, or in the case of an exam, an F for the course. These penalty scores are not subject to low-grade policies outlined earlier. Other situations involving cheating will be dealt with in a similar way. Further actions may be taken in accordance with the statement on academic dishonesty given in the CMU Student Code of Conduct found online.

Tutorial Learning Center (TLC) The TLC is a FREE academic service for all Colorado Mesa University students. Tutors are available on a walk-in basis for many courses. Do you have a quick question? Do you need homework clarification or feedback on a paper? Are you reviewing for a test? Help is available at the TLC! Come to Houston Hall 113 to meet with one of our friendly peer tutors. We are open Monday - Thursday from 8am-6pm, and Fridays 8am-5pm. We are also open Sundays 1pm - 6pm. Tutoring at branch campuses and distance tutoring is also available. Check out the website for schedules and locations at www.coloradomesa.edu/tutoring or call 248-1392.

The Writing Center The Writing Center (Houston Hall 223) serves students across all disciplines and various stages of the writing process. We provide support for students to assimilate into the writing conventions of the university and their specific academic disciplines. Hours of operation are Monday-Friday 10-5 pm. Tutoring in writing will be located at branch campuses also. Workshops for students in APA/MLA and English Language Learner small group tutoring is available.

Educational Access Services (EAS): In coordination with Educational Access Services, reasonable accommodations will be provided for qualified students with disabilities. Students must register with the EAS office in Houston Hall Suite 108 (248-1856) to receive assistance. Please meet with the instructor the first week of class for course information. https://www.coloradomesa.edu/educational-access/

General expectations for my courses:

- We will cover new material every day.
- The first few minutes of class will be devoted to answering questions from the previous class.
- If you have difficulties with the material, talk with me outside of class regarding extra help.
- Spend at least two hours each day, working on homework and studying the notes and text. Set aside this time period now in your schedule, preferably at the same time each day.
- Seek help before homework is due, and before quiz or exam.
- Ask questions – don't delay! Seek help on problems and difficulties as soon as possible. One minute of clarification right after class on a problem may save hours of frustration.
- Be persistent. Learning math sometimes requires lots of effort before a breakthrough occurs.
- Look over the book before coming to class. Sometimes 5 - 10 minutes of glancing over the text ahead of time can make a big difference in getting a handle on material presented in class.

CMU STATEMENT ON SUCCESS

The faculty and staff are glad you have elected to attend Colorado Mesa University or Western Colorado Community College and want you to succeed in achieving your academic goals. The following information is shared with you to enhance the likelihood that you will be successful.

1. Attend class.

Institutional research shows that class attendance and participation are closely linked to your success as a student (i.e., the better your attendance, the better your grade is likely to be). When you are always present, you will understand the course content and how it contributes to your growth as a college student. You are required to attend this class regularly, adhering to the attendance policy established in this course syllabus by your instructor. Additionally, you should review the Attendance Policy of the institution's **Catalog** for further details on expectations. For online courses, check with your instructor and/or class syllabus for expectations delivered in that format.

2. Prepare for and participate in class.

It takes more than showing up for class to succeed. You need to be prepared to actively participate in class. Your instructor has given you a schedule of course topics for the semester, along with readings and/or activities that should be completed prior to coming to class. If you aren't clear about these expectations, talk with your instructor. In general, you should follow the 2:1 rule: two hours of study/homework time for every 1 hour of classroom time. This can vary some from week to week, but on average, most instructors will assume you are putting in the time and keeping pace with the class. So make the effort to stay current and don't leave everything to the end of the term.

By meeting deadlines and managing your time wisely, you will get much more from the class and earn higher grades. Assume that faculty members will not accept late homework and don't offer extra credit assignments. Some may – and by reviewing the syllabus you will know their policies – but instructors have no obligation to do so. A final note. If you need help with study skills, time management, note-taking and the like, consider registering for SUPP 101, a course that helps first-year students with their transition to college life.

3. Use technology to support your success.

All members of this class are expected to show respect to each other and to contribute to a positive academic learning environment of the class. Please turn off cellphones or set them to silent when you are in class. Text messaging, checking email, working on social networking sites, and performing non-class related activities on any electronic device (cell phone, laptop, iPad, etc.) is disruptive and not acceptable behavior during the class session. Check your course syllabus for the consequence of using these devices during class time.

4. Take advantage of campus resources.

We offer numerous academic support resources to help you. The staff of **Tomlinson Library** can assist you with finding information resources either in person or online. The **Tutorial Learning Center** offers *free, walk-in* tutoring for a wide variety of subjects. Maybe it's just a math problem that's not making sense, or perhaps having a peer take a look at your assignment is what you need. The TLC can help with the smallest issue or provide you with tutoring if you have a particularly challenging course. Get help before a small problem becomes a big one. Stop by and see the services they offer, most of which are provided by other students. If your semester gets a little overwhelming, contact the **Office of Student Services** for assistance. Need to engage in some activity outside of classes? Stop by the **Maverick Center** for a good workout, or find students with some similar interests by joining a **student club**.

5. Build relationships with your instructors, advisor, and other students.

a. Your best guidance for success will come from your instructors, and research tells us that your interactions with faculty members is the most important determinate in college success. Instructors genuinely want you to be successful and will do what they can to help you reach your goals. Locate their contact information on the syllabus and store that information in your phone. Each instructor keeps office hours that they set aside to meet with students. If you cannot meet during their office hours, schedule an appointment in advance.

b. Plan to meet with your advisor at least once a semester. At a minimum, consult with your advisor on your schedule for the next semester before registration opens. Popular required courses fill quickly, so if you delay registration, you might not get your preferred courses and could possibly delay your graduation. Advisors provide valuable assistance in determining which courses you need to take for your degree and the best order to take courses. Advisors can also direct you to the most appropriate networks when you are in need of assistance.

If you do not know the name of your advisor, log into MAVzone and click on Student Academics tab. Scroll down the Academic Profile column to Advisors; directly email your advisor by clicking on envelope icon.

c. Connect with other students in all your classes. You and your peers have similar goals and will face similar challenges; this can help you feel less alone in solving problems. Being active in a study group can enrich your understanding of course materials and can provide extra motivation and support to succeed. Learn more about the value of creating a study group at *Fight for First Year in College: Form Study Groups* at http://www.academictips.org/acad/first_y_i_c/formstudygroups.html

6. Use financial aid wisely.

Be aware that your decisions about attending class and considering whether to add or drop a class can affect your financial aid. Discuss potential changes with your advisor before making them. You must complete at least 12 credit hours each semester to be considered full-time, often a requirement to receive financial aid. Part-time students should check with the **Office of Financial Aid** for credit hour requirements.Audited classes do not count for enrollment purposes.

To retain your aid for the next term, you are required to make satisfactory academic progress toward your degree and maintain the following minimum grade point averages below. **If you receive all F's for one term, you will be suspended from financial aid and must repay all Title IV funds.**

Cumulative Credit Hours Earned	**Minimum GPA**
1 to 15	1.70
16 to 30	1.80
31 to 45	1.90
46+	2.00

To remain eligible to receive financial aid, students must be successfully completing 75% of classes attempted. Aid will be suspended until the student successfully increases the completion rate to 75%. Be sure to report any changes in your enrollment, residency status, or receipt of additional resources in writing to the Office of Financial Aid. Financial aid is not available if you have not graduated from your program but exceed the total undergraduate cumulative hours as show below.

Baccalaureate degree:	170 hours
Associate degree:	80 hours
One-year certificate:	40 hours

Math 366 Methods of Applied Mathematics II **Spring 2019 Course Calendar**

	Monday	Wednesday	Friday
1	21-Jan	Syllabus Course Overview 23-Jan	Intro Concepts and Software 25-Jan
2	19.1 Intro Numerical Methods 28-Jan	19.1 Intro Numerical Methods 30-Jan	19.2 Soln of Eqns by Iteration 1-Feb
3	19.2 Soln of Eqns by Iteration 4-Feb	19.2 Soln of Eqns by Iteration Add/Drop Date 6-Feb	19.2 Soln of Eqns by Iteration 8-Feb
4	19.3 Lagrange Interpolation 11-Feb	19.3 Lagrange Interpolation 13-Feb	19.3 Lagrange Interpolation 15-Feb
5	19.4 Spline Interpolation 18-Feb	19.4 Spline Interpolation 20-Feb	19.5 Numerical Integ & Diff 22-Feb
6	19.5 Numerical Integ & Diff 25-Feb	19.5 Numerical Integ & Diff 27-Feb	19.5 Numerical Integ & Diff 1-Mar
7	20.1 Linear Systems: Gauss Elim 4-Mar	20.1 Linear Systems: Gauss Elim 6-Mar	20.1 Linear Systems: Gauss Elim 8-Mar
8	20.3 Linear Systems: Iteration 11-Mar	20.3 Linear Systems: Iteration 13-Mar	20.4 Linear Systems: Conditioning 15-Mar
9	18-Mar	20-Mar	22-Mar
10	21.1 First Order ODE Methods 25-Mar	21.1 First Order ODE Methods Withdraw Date 27-Mar	21.1 First Order ODE Methods 29-Mar
11	20.2 Multi-Step Methods 1-Apr	20.2 Multi-Step Methods 3-Apr	20.2 Multi-Step Methods 5-Apr
12	21.3 Systems & Higher Order ODEs 8-Apr	21.3 Systems & Higher Order ODEs 10-Apr	21.3 Systems & Higher Order ODEs 12-Apr
13	21.4 Elliptic PDEs 15-Apr	21.4 Elliptic PDEs 17-Apr	21.4 Elliptic PDEs 19-Apr
14	21.5 Neumann & Mixed Probs; Irregular Boundary 22-Apr	21.5 Neumann & Mixed Probs; Irregular Boundary 24-Apr	21.6 Parabolic PDEs 26-Apr
15	21.6 Parabolic PDEs 29-Apr	21.6 Parabolic PDEs 1-May	21.7 Hyperbolic PDEs 3-May
16	21.7 Hyperbolic PDEs 6-May	Catch-Up & Review 8-May	Catch-Up & Review 10-May
17	Final 8:00 – 9:50 am 13-May	15-May	17-May